

142917

# Barr

Engineering Company

December 9, 1997

Mr. Mike Bellot  
SR-6J  
Project Manager  
U.S. EPA, Region V  
77 West Jackson Boulevard  
Chicago, IL 60604-3590

**Re: Waukegan Manufactured Gas and Coke Plant Site**

Dear Mr. Bellot:

Enclosed are the tabulated data from the beach transect and lake sampling. This work was performed from September 9 to September 15, 1997 pursuant to the August 20, 1997 Work Plan. Six surface water sampling points were added to the program to meet the U.S. EPA's response comments to the proposed sampling plan. The data are presented on the following summary tables:

- 1997 Lake Michigan Samples

Water Quality Data

This is the laboratory and field data for surface water samples.

- 1997 Beach Transect Samples

Soil Quality Data

This is the organic carbon data for SB-64 samples.

- 1997 Beach Transect Samples

Water Quality Data

This is the laboratory and field data for groundwater samples.

- Boring logs from SB-61, SB-62, SB-63 and SB-64

8300 Norman Center Drive  
Minneapolis, MN 55437-1026  
Phone: (612) 832-2600  
Fax: (612) 832-2601

555 West 27th Street  
Hibbing, MN 55746  
Phone: (218) 262-3465  
Fax: (218) 262-3460

202 West Superior Street  
Duluth, MN 55802  
Phone: (218) 727-5218  
Fax: (218) 727-6450

P.O. Box 130917  
Ann Arbor, MI 48113-0917  
Phone: (313) 327-1200  
Fax: (313) 327-1212

- Figure 1 showing boring locations
- Figure 2 showing sample locations within the geologic cross-section
- Figure 3 showing surface water sample locations
- Figure 4 showing surface water velocities

Braun Laboratories analyzed the ammonia for surface water samples. We reviewed Braun Laboratories' practices, and are satisfied that they used appropriate procedures to justify the detection limit of 0.02 mg/L shown in the 1997 Lake Michigan water sample data table.

We are in the process of evaluating the data. We are examining the degree to which this data is consistent with previous beach sample data, and how this new data affects the Site Conceptual Model. We would like to discuss our latest thinking with you during our meeting on December 17. That meeting is scheduled for:

10 a.m. to 3:00 p.m., Wednesday, December 17

Russ Selman's office

Katten, Muchin & Zavis

525 West Monroe, 21st Floor

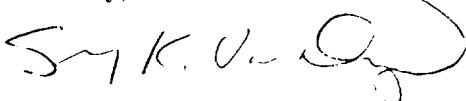
Chicago, IL 60661

Phone: (312)902-5390

We will also be discussing your comments on Sections 3 and 4, Remedial Action Objectives and Development and Screening of Alternatives of the Feasibility Study that were submitted to you on October 31, 1997.

Please call me or Jim Langseth with any questions.

Sincerely,



Sherry K. Van Duyn

SKV/tmn  
Enclosure  
c: Jerry Willman, w/enc.  
Ike Johnson, w/enc.

Phil Smith, w/enc.  
Sean Mulroney, w/enc.  
Steve Matuszak, w/enc.  
Jerry Picha, w/enc.  
Stephen Armstrong, w/enc.  
Russell Selman, w/enc.  
James Campbell, w/enc.  
Jerry Maynard, w/enc.  
Ed Peterson, w/enc.  
Dave Arnold, w/enc.  
Dr. Richard Brown, w/enc.  
Dr. Bruce Rittmann, w/enc.  
Dr. Charles Gantzer, w/enc.

P:\13\49\003\wcp\55542-1

**1997 LAKE MICHIGAN SAMPLES**  
**WATER QUALITY DATA**

(concentrations in mg/L, unless noted otherwise)

	LM-6N	LM-5N	LM-4N	LM-3N	LM-2N	LM-1N	H-1	LM-1S
	-----	-----	-----	-----	-----	-----	-----	-----
	09/14/97	09/14/97	09/14/97	09/14/97	09/14/97	09/14/97	09/14/97	09/14/97
Phenol	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
o-Cresol	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
m-Cresol	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
p-Cresol	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
2,4-Dimethylphenol	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Phenol, 4AAP	0.50	<0.01	0.45	0.06	<0.01	<0.01	<0.01	0.20
Benzene	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Dissolved Solids	177	161	167	175	180	170	173	173
Chloride	10.8	10.9	11.1	11.0	11.0	11.2	11.1	11.0
Sulfate	20.1	22.0	21.9	22.8	24.0	32.6	21.8	22.7
Ammonia Nitrogen	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Temperature, oC	19.8	20.8	20.0	19.7	19.7	20.4	21.4	20.5
Specific Conductance @ 25	283	284	285	285	285	286	287	286
pH, standard units	8.17	8.12	8.16	8.13	8.07	8.04	8.08	8.22
Redox, mV	67	66	58	46	34	32	62	68
Dissolved Oxygen	8.66	8.75	8.72	8.74	8.07	8.64	8.70	9.84
	LM-2S	LCZ-6N	LCZ-5N	LCZ-3N	LCZ-2N	LCZ-H1	LCZ-2S	
	-----	-----	-----	-----	-----	-----	-----	
	09/14/97	09/14/97	09/14/97	09/14/97	09/14/97	09/14/97	09/14/97	
Phenol	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	
o-Cresol	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	
m-Cresol	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	
p-Cresol	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	
2,4-Dimethylphenol	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	
Phenol, 4AAP	0.31	0.10	0.13	<0.01	<0.01	0.23	0.04	
Benzene	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Total Dissolved Solids	165	168	164	169	192	176	194	
Chloride	11.3	18.8	10.7	10.8	10.9	10.8	10.8	
Sulfate	23.7	25.7	22.5	21.0	23.6	47.0	22.9	
Ammonia Nitrogen	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Temperature, oC	21.5	21.3	22.4	20.5	20.5	20.6	20.6	
Specific Conductance @ 25	286	285	286	285	285	284	282	
pH, standard units	8.19	8.16	8.11	8.17	8.09	8.22	8.14	
Redox, mV	83	99	112	77	68	88	77	
Dissolved Oxygen	8.63	7.92	7.51	7.87	7.86	8.79	9.21	

1997 BEACH TRANSECT SAMPLES  
SOIL QUALITY DATA

(concentrations in mg/kg)

	SB6402	SB6404	SB6410	SB6416	SB6422	SB6428
Sample I.D.	-----	-----	-----	-----	-----	-----
Soil Boring	09/12/97	09/12/97	09/11/97	09/11/97	09/11/97	09/11/97
Depth	64	64	64	64	64	64
Carbon, total organic	0-2'	2-4'	8-10'	14-16'	20-22'	26-28'
	138	136	164	576	855	532
	-----	-----	-----	-----	-----	-----
	3,.006					
	11/05/97					

1997 BEACH TRANSECT SAMPLES  
WATER QUALITY DATA

(concentrations in mg/L, unless noted otherwise)

	MW6D			MW6S		
	09/10/97	09/10/97	09/10/97	09/10/97	09/10/97	09/10/97
	Sample	Replicate A	Replicate B	Sample	Replicate A	Replicate B
Sample I.D.	--	--	--	--	--	--
Soil Boring	--	--	--	--	--	--
Depth	--	--	--	--	--	--
Phenol	99	--	--	1	--	--
2-Chlorophenol	<20	--	--	<0.15	--	--
o-Cresol	13 j	--	--	0.33	--	--
m-Cresol	--	--	--	--	--	--
p-Cresol	<20	--	--	0.56	--	--
2,4-Dimethylphenol	10 j	--	--	0.16	--	--
2-Nitrophenol	<20	--	--	<0.15	--	--
Benzoic Acid	<100	--	--	<0.75	--	--
2,4-Dichlorophenol	<20	--	--	<0.15	--	--
4-Chloro-3-methylphenol	<20	--	--	<0.15	--	--
2,4,6-Trichlorophenol	<20	--	--	<0.15	--	--
2,4,5-Trichlorophenol	<100	--	--	<0.75	--	--
2,4-Dinitrophenol	<100	--	--	<0.75	--	--
4-Nitrophenol	<100	--	--	<0.75	--	--
2-Methyl-4,6-dinitrophenol	<100	--	--	<0.75	--	--
Pentachlorophenol	<100	--	--	<0.75	--	--
Benzene	2.2	--	--	0.081	--	--
Ethyl Benzene	0.13	--	--	0.074	--	--
Toluene	0.58	--	--	0.061	--	--
Xylenes	<0.10	--	--	0.12	--	--
Arsenic	28.4	--	--	0.300	--	--
Arsenic, filtered	27.1	--	--	0.287	--	--
Iron, filtered	4.36	--	--	0.467	--	--
Manganese, filtered	0.0472	--	--	0.191	--	--
Total Alkalinity as CaCO <sub>3</sub>	5230	--	--	536	536	--
Total Dissolved Solids	1890	1790	--	617	619	--
Chloride	4090	2220	2220	82.4	98.3	75.6
Cyanide, WAD	0.106	--	--	<0.0050	<0.0050	--
Sulfate	95.3	96.3	--	40.6	42.5	--
Sulfide, total	4.0	--	--	0.4	0.4	--
Thiocyanate	214	224	--	7.3	7.03	--
Ammonia Nitrogen	2140	2570	2570	51.7	42.8	48.9
Nitrate	0.09	0.07	--	<0.05	<0.05	--
Nitrite	0.14	0.13	--	<0.05	<0.05	--
Phosphorus, total	12.4	--	--	0.37	0.37	--
Total Kjeldahl Nitrogen	2570	--	--	68.3	68.3	--
Biochemical Oxygen Demand (5-day)	1600	--	--	21	21	--
Chemical Oxygen Demand	2890	--	--	41	41	--
Carbon, dissolved	1820	--	--	52.5	52.5	--
Phenol, 4AAP	330	335	--	5.89	4.87	--
Carbon, total organic	1270	--	--	12.5	12.5	--
Carbon, dissolved organic	1620	--	--	10.0	10.0	--
Temperature, oC	11.1	--	--	14.4	--	--
Specific Conductance @ 25oC	2180	--	--	1310	--	--
pH, standard units	7.78	--	--	7.68	--	--
Redox, mV	-279	--	--	-173	--	--
Dissolved Oxygen	0.21	--	--	0.40	--	--
Nitrite	0-1.25	--	--	0-1.25	--	--
Nitrate	0-2.5	--	--	0-2.5	--	--

-----  
-- Not analyzed.

j Reported value is less than the stated laboratory quantitation limit and is considered an estimated value.

3,.004

11/04/97

1997 BEACH TRANSECT SAMPLES  
WATER QUALITY DATA

(concentrations in mg/L, unless noted otherwise)

	MW13D			MW13S		
	09/10/97 Sample	09/10/97 Replicate A	09/10/97 Replicate B	09/10/97 Sample	09/10/97 Replicate A	09/10/97 Replicate B
Sample I.D.	--	--	--	--	--	--
Soil Boring	--	--	--	--	--	--
Depth	--	--	--	--	--	--
Phenol	300	--	--	0.051	--	--
2-Chlorophenol	<50	--	--	<0.010	--	--
o-Cresol	35 j	--	--	0.005 j	--	--
m-Cresol	--	--	--	--	--	--
p-Cresol	150	--	--	0.018	--	--
2,4-Dimethylphenol	9.5 j	--	--	0.001 j	--	--
2-Nitrophenol	<50	--	--	<0.010	--	--
Benzoic Acid	<250	--	--	<0.050	--	--
2,4-Dichlorophenol	<50	--	--	<0.010	--	--
4-Chloro-3-methylphenol	<50	--	--	<0.010	--	--
2,4,6-Trichlorophenol	<50	--	--	<0.010	--	--
2,4,5-Trichlorophenol	<250	--	--	<0.050	--	--
2,4-Dinitrophenol	<250	--	--	<0.050	--	--
4-Nitrophenol	<250	--	--	<0.050	--	--
2-Methyl-4,6-dinitrophenol	<250	--	--	<0.050	--	--
Pentachlorophenol	<250	--	--	<0.050	--	--
Benzene	1.1	--	--	<0.0010	--	--
Ethyl Benzene	<0.10	--	--	<0.0010	--	--
Toluene	<0.10	--	--	<0.0010	--	--
Xylenes	<0.10	--	--	<0.0010	--	--
Arsenic	23.8	--	--	0.143	--	--
Arsenic, filtered	18.4	--	--	0.156	--	--
Iron, filtered	0.765	--	--	2.04	--	--
Manganese, filtered	0.151	--	--	1.10	--	--
Total Alkalinity as CaCO <sub>3</sub>	2640	--	--	261	--	--
Total Dissolved Solids	1510	1670	--	285	300	--
Chloride	3580	3310	3650	2.3	2.2	2.2
Cyanide, WAD	0.024	--	--	<0.0050	--	--
Sulfate	425	398	--	<2.0	<2.0	--
Sulfide, total	2.6	--	--	<0.1	--	--
Thiocyanate	545	515	545	0.738	--	--
Ammonia Nitrogen	1220	1680	1570	<0.2	<0.2	<0.2
Nitrate	<0.25	<0.25	--	<0.05	<0.05	--
Nitrite	<0.5	<0.05	--	<0.05	<0.05	--
Phosphorus, total	3.24	--	--	0.55	--	--
Total Kjeldahl Nitrogen	1760	--	--	0.7	--	--
Biochemical Oxygen Demand (5-day)	3050	--	--	<20	--	--
Chemical Oxygen Demand	4880	--	--	<20	--	--
Carbon, dissolved	1420	--	--	28.1	--	--
Phenol, 4AAP	974	907	--	<0.01	<0.01	--
Carbon, total organic	1380	--	--	6.3	--	--
Carbon, dissolved organic	1350	--	--	1.4	--	--
Temperature, °C	10.8	--	--	16.6	--	--
Specific Conductance @ 25°C	1615	--	--	487	--	--
pH, standard units	8.52	--	--	7.03	--	--
Redox, mV	-280	--	--	-123	--	--
Dissolved Oxygen, mg/L	0.43	--	--	0.11	--	--
Nitrite	0-1.25	--	--	0-1.25	--	--
Nitrate	0-2.5	--	--	0-2.5	--	--

-- Not analyzed.

j Reported value is less than the stated laboratory quantitation limit and is considered an estimated value.

3,.004

11/04/97

1997 BEACH TRANSECT SAMPLES  
WATER QUALITY DATA

(concentrations in mg/L, unless noted otherwise)

	SB6104			SB6110		
	09/09/97 Sample	09/09/97 Replicate A	09/09/97 Replicate B	09/09/97 Sample	09/09/97 Replicate A	09/09/97 Replicate B
Sample I.D.	SB-61W04	SB-61W04	SB-61W04	SB-61W10	SB-61W10	SB-61W10
Soil Boring	61	61	61	61	61	61
Depth	4	4	4	10	10	10
Phenol	<0.010	--	--	<0.010	--	--
2-Chlorophenol	<0.010	--	--	<0.010	--	--
o-Cresol	<0.010	--	--	<0.010	--	--
m-Cresol	--	--	--	--	--	--
p-Cresol	<0.010	--	--	<0.010	--	--
2,4-Dimethylphenol	<0.010	--	--	<0.010	--	--
2-Nitrophenol	<0.010	--	--	<0.010	--	--
Benzoic Acid	<0.050	--	--	<0.050	--	--
2,4-Dichlorophenol	<0.010	--	--	<0.010	--	--
4-Chloro-3-methylphenol	<0.010	--	--	<0.010	--	--
2,4,6-Trichlorophenol	<0.010	--	--	<0.010	--	--
2,4,5-Trichlorophenol	<0.050	--	--	<0.050	--	--
2,4-Dinitrophenol	<0.050	--	--	<0.050	--	--
4-Nitrophenol	<0.050	--	--	<0.050	--	--
2-Methyl-4,6-dinitrophenol	<0.050	--	--	<0.050	--	--
Pentachlorophenol	<0.050	--	--	<0.050	--	--
Benzene	<0.0010	--	--	<0.0010	--	--
Ethyl Benzene	<0.0010	--	--	<0.0010	--	--
Toluene	<0.0010	--	--	<0.0010	--	--
Xylenes	<0.0010	--	--	<0.0010	--	--
Arsenic	<0.0050	--	--	0.320	--	--
Arsenic, filtered	<0.0050	--	--	0.257	--	--
Iron, filtered	<0.100	--	--	3.19	--	--
Manganese, filtered	0.0151	--	--	0.382	--	--
Total Alkalinity as CaCO <sub>3</sub>	162	--	--	227	--	--
Total Dissolved Solids	217	208	--	269	269	--
Chloride	12.4	12.5	12.4	2.8	2.7	2.8
Cyanide, WAD	<5.0	--	--	<5.0	--	--
Sulfate	25.5	26.3	--	11.8	9.9	--
Sulfide, total	<0.1	--	--	<0.1	--	--
Thiocyanate	0.131	0.738	--	<0.500	<0.500	--
Ammonia Nitrogen	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Nitrate	0.10	0.08	--	1.13	0.06	--
Nitrite	<0.05	<0.05	--	<0.05	<0.05	--
Phosphorus, total	0.04	--	--	1.09	--	--
Total Kjeldahl Nitrogen	<0.1	--	--	1.4	--	--
Biochemical Oxygen Demand (5-day)	<20	--	--	<20	--	--
Chemical Oxygen Demand	<20	--	--	<20	--	--
Carbon, dissolved	26.0	--	--	44.8	--	--
Phenol, 4AAP	<0.01	<0.01	--	<0.01	<0.01	--
Carbon, total organic	1.6	--	--	6.2	--	--
Carbon, dissolved organic	2.7	--	--	2.6	--	--
Temperature, oC	19.9	--	--	16.7	--	--
Specific Conductance @ 25oC	371	--	--	462	--	--
pH, standard units	7.47	--	--	7.47	--	--
Redox, mV	-71	--	--	-187	--	--
Dissolved Oxygen, mg/L	1.08	--	--	0.39	--	--
Nitrite	0-1.25	--	--	0-1.25	--	--
Nitrate	0-2.5	--	--	0-2.5	--	--

-- Not analyzed.

3,.004

11/04/97

**1997 BEACH TRANSECT SAMPLES**  
**WATER QUALITY DATA**

(concentrations in mg/L, unless noted otherwise)

	SB6116			SB6122		
	09/09/97 Sample	09/09/97 Replicate A	09/09/97 Replicate B	09/10/97 Sample	09/10/97 Replicate A	09/10/97 Replicate B
Sample I.D.	SB-61W16	SB-61W16	SB-61W16	SB-61W22	SB-61W22	SB-61W22
Soil Boring	61	61	61	61	61	61
Depth	16	16	16	22	22	22
 Phenol	<0.010	--	--	<0.010	--	--
2-Chlorophenol	<0.010	--	--	<0.010	--	--
<i>o</i> -Cresol	<0.010	--	--	<0.010	--	--
<i>m</i> -Cresol	--	--	--	--	--	--
<i>p</i> -Cresol	<0.010	--	--	<0.010	--	--
2,4-Dimethylphenol	<0.010	--	--	0.024	--	--
2-Nitrophenol	<0.010	--	--	<0.010	--	--
Benzoic Acid	<0.050	--	--	<0.050	--	--
2,4-Dichlorophenol	<0.010	--	--	<0.010	--	--
4-Chloro-3-methylphenol	<0.010	--	--	<0.010	--	--
2,4,6-Trichlorophenol	<0.010	--	--	<0.010	--	--
2,4,5-Trichlorophenol	<0.050	--	--	<0.050	--	--
2,4-Dinitrophenol	<0.050	--	--	<0.050	--	--
4-Nitrophenol	<0.050	--	--	<0.050	--	--
2-Methyl-4,6-dinitrophenol	<0.050	--	--	<0.050	--	--
Pentachlorophenol	<0.050	--	--	<0.050	--	--
 Benzene	<0.0010	--	--	0.0077	--	--
Ethyl Benzene	<0.0010	--	--	<0.0010	--	--
Toluene	<0.0010	--	--	<0.0010	--	--
Xylenes	<0.0010	--	--	<0.0010	--	--
 Arsenic	0.420	--	--	0.143	--	--
Arsenic, filtered	0.338	--	--	0.116	--	--
Iron, filtered	1.74	--	--	<0.100	--	--
Manganese, filtered	0.239	--	--	0.106	--	--
 Total Alkalinity as CaCO <sub>3</sub>	179	--	--	518	--	--
Total Dissolved Solids	219	211	--	400	383	--
Chloride	6.0	6.1	5.9	121	123	92
Cyanide, WAD	<0.0050	--	--	<0.0050	--	--
Sulfate	16.7	18.1	--	14.0	10.7	--
Sulfide, total	<0.1	--	--	0.3	--	--
Thiocyanate	0.653	0.823	--	2.10	2.01	--
Ammonia Nitrogen	<0.2	<0.2	0.7	49.9	47.5	48.0
Nitrate	0.08	0.21	--	0.06	0.08	--
Nitrite	<0.05	<0.05	--	<0.05	0.05	--
Phosphorus, total	0.18	--	--	1.20	--	--
Total Kjeldahl Nitrogen	1.6	--	--	55.8	--	--
Biochemical Oxygen Demand (5-day)	<20	--	--	<20	--	--
Chemical Oxygen Demand	<20	--	--	291	--	--
Carbon, dissolved	27.6	--	--	23.7	--	--
Phenol, 4AAP	0.08	0.71	--	0.02	<0.01	--
Carbon, total organic	6.5	--	--	22.3	--	--
Carbon, dissolved organic	3.7	--	--	5.3	--	--
 Temperature, °C	16.0	--	--	18.0	--	--
Specific Conductance @ 25°C	70	--	--	50	--	--
pH, standard units	7.76	--	--	8.06	--	--
Redox, mV	-130	--	--	-30	--	--
Dissolved Oxygen	9.00	--	--	8.45	--	--
Nitrite	0-1.25	--	--	0-1.25	--	--
Nitrate	0-2.5	--	--	0-2.5	--	--

-----  
-- Not analyzed.

3,.004

11/04/97

1997 BEACH TRANSECT SAMPLES  
WATER QUALITY DATA

(concentrations in mg/L, unless noted otherwise)

	SB6130			SB6206		
	09/10/97 Sample	09/10/97 Replicate A	09/10/97 Replicate B	09/12/97 Sample	09/12/97 Replicate A	09/12/97 Replicate B
Sample I.D.	SB-61W30	SB-61W30	SB-61W30	SB-62W06	SB-62W06	SB-62W06
Soil Boring	61	61	61	62	62	62
Depth	30	30	30	6	6	6
Phenol	160	--	--	0.24	--	--
2-Chlorophenol	<25	--	--	<0.040	--	--
<i>o</i> -Cresol	18 j	--	--	0.020 j	--	--
<i>m</i> -Cresol	--	--	--	--	--	--
<i>p</i> -Cresol	<25	--	--	0.063	--	--
2,4-Dimethylphenol	4.8 j	--	--	<0.040	--	--
2-Nitrophenol	<25	--	--	<0.040	--	--
Benzoic Acid	<120	--	--	<0.20	--	--
2,4-Dichlorophenol	<25	--	--	<0.040	--	--
4-Chloro-3-methylphenol	<25	--	--	<0.040	--	--
2,4,6-Trichlorophenol	<25	--	--	<0.040	--	--
2,4,5-Trichlorophenol	<120	--	--	<0.020	--	--
2,4-Dinitrophenol	<120	--	--	<0.020	--	--
4-Nitrophenol	<120	--	--	<0.020	--	--
2-Methyl-4,6-dinitrophenol	<120	--	--	<0.020	--	--
Pentachlorophenol	<120	--	--	<0.020	--	--
Benzene	0.38	--	--	<0.0010	--	--
Ethyl Benzene	<0.010	--	--	<0.0010	--	--
Toluene	<0.010	--	--	<0.0010	--	--
Xylenes	<0.010	--	--	<0.0010	--	--
Arsenic	21.0	--	--	0.121	--	--
Arsenic, filtered	16.5	--	--	0.128	--	--
Iron, filtered	1.42	--	--	1.64	--	--
Manganese, filtered	0.0725	--	--	0.376	--	--
Total Alkalinity as CaCO <sub>3</sub>	5380	--	--	233	--	--
Total Dissolved Solids	928	1110	--	272	272	--
Chloride	2300	1810	2060	2.1	2.3	2.2
Cyanide, WAD	0.178	--	--	<0.0050	--	--
Sulfate	434	419	--	14.9	14.3	--
Sulfide, total	2.4	--	--	<0.1	--	--
Thiocyanate	315	530	--	<1	<1	--
Ammonia Nitrogen	1050	1150	1070	0.4	<0.2	<0.2
Nitrate	0.10	0.09	--	<0.05	<0.05	--
Nitrite	0.06	0.07	--	<0.05	<0.05	--
Phosphorus, total	3.20	--	--	0.37	--	--
Total Kjeldahl Nitrogen	1750	--	--	0.9	--	--
Biochemical Oxygen Demand (5-day)	2850	--	--	<10	--	--
Chemical Oxygen Demand	4670	--	--	<20	--	--
Carbon, dissolved	1220	--	--	33.7	--	--
Phenol, 4AAP	588	783	--	0.03	<0.01	--
Carbon, total organic	1240	--	--	14.7	--	--
Carbon, dissolved organic	1160	--	--	1.7	--	--
Temperature, °C	14.7	--	--	17.6	--	--
Specific Conductance @ 25°C	39	--	--	430	--	--
pH, standard units	8.38	--	--	7.46	--	--
Redox, mV	-77	--	--	-198	--	--
Dissolved Oxygen	3.10	--	--	0.53	--	--
Nitrite	2.5	--	--	0.2.5	--	--
Nitrate	5.10	--	--	0.5	--	--

-- Not analyzed.

j Reported value is less than the stated laboratory quantitation limit and is considered an estimated value.

3,.004

11/04/97

**1997 BEACH TRANSECT SAMPLES  
WATER QUALITY DATA**

(concentrations in mg/L, unless noted otherwise)

	SB6212			SB6218			
	09/12/97	09/12/97	09/12/97	09/13/97	09/13/97	09/13/97	09/13/97
	Sample	Replicate A	Replicate B	Sample	Duplicate	Replicate A	Replicate B
Sample I.D.	SB-62W12	SB-62W12	SB-62W12	SB-62W18	SB-62W18	SB-62W18	SB-62W18
Soil Boring	62	62	62	62	62	62	62
Depth	12	12	12	18	18	18	18
Phenol	0.042	--	--	0.017	0.035	--	--
2-Chlorophenol	<0.010	--	--	<0.010	<0.010	--	--
<i>o</i> -Cresol	0.004 j	--	--	0.002 j	0.003 j	--	--
<i>m</i> -Cresol	--	--	--	--	--	--	--
<i>p</i> -Cresol	0.011	--	--	0.007 j	0.010	--	--
2,4-Dimethylphenol	<0.010	--	--	<0.010	<0.010	--	--
2-Nitrophenol	<0.010	--	--	<0.010	<0.010	--	--
Benzoic Acid	<0.050	--	--	0.013 j	0.012 j	--	--
2,4-Dichlorophenol	<0.010	--	--	<0.010	<0.010	--	--
4-Chloro-3-methylphenol	<0.010	--	--	<0.010	<0.010	--	--
2,4,6-Trichlorophenol	<0.010	--	--	<0.010	<0.010	--	--
2,4,5-Trichlorophenol	<0.050	--	--	<0.050	<0.050	--	--
2,4-Dinitrophenol	<0.050	--	--	<0.050	<0.050	--	--
4-Nitrophenol	<0.050	--	--	<0.050	<0.050	--	--
2-Methyl-4,6-dinitrophenol	<0.050	--	--	<0.050	<0.050	--	--
Pentachlorophenol	<0.050	--	--	<0.050	<0.050	--	--
Benzene	<0.0010	--	--	0.013	--	--	--
Ethyl Benzene	<0.0010	--	--	<0.0010	--	--	--
Toluene	<0.0010	--	--	<0.0010	--	--	--
Xylenes	<0.0010	--	--	0.0011	--	--	--
Arsenic	0.515	--	--	1.12	1.14	--	--
Arsenic, filtered	0.512	--	--	1.07	0.991	--	--
Iron, filtered	1.31	--	--	0.898	0.888	--	--
Manganese, filtered	0.114	--	--	0.0595	0.0588	--	--
Total Alkalinity as CaCO <sub>3</sub>	227	--	--	287	--	--	--
Total Dissolved Solids	274	263	--	413	--	399	--
Chloride	3.0	2.9	2.9	74.1	--	74.1	74.7
Cyanide, WAD	<0.0050	--	--	<0.0050	--	--	--
Sulfate	6.5	7.0	--	<2.0	--	<2.0	--
Sulfide, total	<0.1	--	--	<0.1	--	--	--
Thiocyanate	<1	<1	--	<1	--	<1	--
Ammonia Nitrogen	<0.2	<0.2	<0.2	6.9	7.3	6.1	6.3
Nitrate	<0.05	<0.05	--	<0.05	0.39	0.06	--
Nitrite	<0.05	<0.05	--	<0.05	--	<0.05	--
Phosphorus, total	0.94	--	--	0.35	0.39	--	--
Total Kjeldahl Nitrogen	1.4	--	--	8.3	8.5	--	--
Biochemical Oxygen Demand (5-day)	<10	--	--	<20	--	--	--
Chemical Oxygen Demand	<20	--	--	40	<20	--	--
Carbon, dissolved	38.8	--	--	44.0	--	--	--
Phenol, 4AAP	<0.01	<0.01	--	<0.01	0.02	<0.01	--
Carbon, total organic	7.4	--	--	4.1	3.0	--	--
Carbon, dissolved organic	4.0	--	--	3.5	--	--	--
Temperature, oC	15.1	--	--	12.7	--	--	--
Specific Conductance @ 25oC	430	--	--	710	--	--	--
pH, standard units	7.81	--	--	7.85	--	--	--
Redox, mV	-211	--	--	-152	--	--	--
Dissolved Oxygen	0.47	--	--	1.02	--	--	--
Nitrite	0.1-25	--	--	3-15	--	--	--
Nitrate	0-2.5	--	--	10-15	--	--	--

-- Not analyzed.

j Reported value is less than the stated laboratory quantitation limit and is considered an estimated value.

3,.004

11/04/97

1997 BEACH TRANSECT SAMPLES  
WATER QUALITY DATA

(concentrations in mg/L, unless noted otherwise)

	SB6224			SB6230			
	09/13/97 Sample	09/13/97 Replicate A	09/13/97 Replicate B	09/13/97 Sample	09/13/97 Duplicate	09/13/97 Replicate A	09/13/97 Replicate B
Sample I.D.	SB-62W24	SB-62W24	SB-62W24	SB-62W30	SB-62W30	SB-62W30	SB-62W30
Soil Boring	62	62	62	62	62	62	62
Depth	24	24	24	30	30	30	30
Phenol	1.4	--	--	430	--	--	--
2-Chlorophenol	<0.30	--	--	<70	--	--	--
o-Cresol	1.1	--	--	43 j	--	--	--
m-Cresol	--	--	--	--	--	--	--
p-Cresol	2.2	--	--	170	--	--	--
2,4-Dimethylphenol	0.47	--	--	10 j	--	--	--
2-Nitrophenol	<0.30	--	--	<70	--	--	--
Benzoic Acid	<1.5	--	--	<350	--	--	--
2,4-Dichlorophenol	<0.30	--	--	<70	--	--	--
4-Chloro-3-methylphenol	<0.30	--	--	<70	--	--	--
2,4,6-Trichlorophenol	<0.30	--	--	<70	--	--	--
2,4,5-Trichlorophenol	<1.5	--	--	<350	--	--	--
2,4-Dinitrophenol	<1.5	--	--	<350	--	--	--
4-Nitrophenol	<1.5	--	--	<350	--	--	--
2-Methyl-4,6-dinitrophenol	<1.5	--	--	<350	--	--	--
Pentachlorophenol	<1.5	--	--	<350	--	--	--
Benzene	0.047	--	--	0.75	0.72	--	--
Ethyl Benzene	<0.0010	--	--	<0.025	<0.050	--	--
Toluene	<0.0010	--	--	<0.025	<0.050	--	--
Xylenes	<0.0010	--	--	<0.025	<0.050	--	--
Arsenic	0.991	--	--	62.7	--	--	--
Arsenic, filtered	1.09	--	--	53.6	--	--	--
Iron, filtered	0.412	--	--	1.23	--	--	--
Manganese, filtered	0.0189	--	--	0.0161	--	--	--
Total Alkalinity as CaCO <sub>3</sub>	622	--	--	2840	--	--	--
Total Dissolved Solids	492	500	--	1980	--	2040	--
Chloride	446	459	459	3950	--	4000	4100
Cyanide, WAD	0.0094	--	--	0.428	--	--	--
Sulfate	<2.0	<2.0	--	630	--	627	--
Sulfide, total	0.2	--	--	11.1	--	--	--
Thiocyanate	1.14	2.81	--	679	--	804	--
Ammonia Nitrogen	253	236	177	903	996	1200	1270
Nitrate	<0.05	0.06	--	<0.05	--	<0.05	--
Nitrite	<0.05	<0.05	--	<0.05	--	<0.05	--
Phosphorus, total	0.70	--	--	4.85	--	--	--
Total Kjeldahl Nitrogen	257	--	--	1480	--	--	--
Biochemical Oxygen Demand (5-day)	23	--	--	3600	--	--	--
Chemical Oxygen Demand	185	--	--	5980	--	--	--
Carbon, dissolved	116	--	--	1600	--	--	--
Phenol, 4AAP	5.04	5.42	--	1150	--	1130	--
Carbon, total organic	29.8	--	--	1710	--	--	--
Carbon, dissolved organic	19.2	--	--	1630	--	--	--
Temperature, oC	11.5	--	--	12.3	--	--	--
Specific Conductance @ 25oC	283	--	--	1531	--	--	--
pH, standard units	8.28	--	--	8.63	--	--	--
Redox, mV	-202	--	--	-278	--	--	--
Dissolved Oxygen	0	--	--	0.04	--	--	--
Nitrite	2-3	--	--	2-3	--	--	--
Nitrate	3-5	--	--	3-5	--	--	--

-- Not analyzed.

j Reported value is less than the stated laboratory quantitation limit and is considered an estimated value.

3,.004

11/04/97

1997 BEACH TRANSECT SAMPLES  
WATER QUALITY DATA

(concentrations in mg/L, unless noted otherwise)

	SB6306			SB6312		
	09/12/97 Sample	09/12/97 Replicate A	09/12/97 Replicate B	09/12/97 Sample	09/12/97 Replicate A	09/12/97 Replicate B
Sample I.D.	SB-63W06	SB-63W06	SB-63W06	SB-63W12	SB-63W12	SB-63W12
Soil Boring	63	63	63	63	63	63
Depth	6	6	6	12	12	12
Phenol	0.056	--	--	0.17	--	--
2-Chlorophenol	<0.010	--	--	<0.030	--	--
o-Cresol	0.006 j	--	--	0.014 j	--	--
m-Cresol	--	--	--	--	--	--
p-Cresol	0.022	--	--	0.047	--	--
2,4-Dimethylphenol	0.001 j	--	--	<0.030	--	--
2-Nitrophenol	<0.010	--	--	<0.030	--	--
Benzoic Acid	<0.050	--	--	<0.15	--	--
2,4-Dichlorophenol	<0.010	--	--	<0.030	--	--
4-Chloro-3-methylphenol	<0.010	--	--	<0.030	--	--
2,4,6-Trichlorophenol	<0.010	--	--	<0.030	--	--
2,4,5-Trichlorophenol	<0.050	--	--	<0.15	--	--
2,4-Dinitrophenol	<0.050	--	--	<0.15	--	--
4-Nitrophenol	<0.050	--	--	<0.15	--	--
2-Methyl-4,6-dinitrophenol	<0.050	--	--	<0.15	--	--
Pentachlorophenol	<0.050	--	--	<0.15	--	--
Benzene	<0.0010	--	--	0.0014	--	--
Ethyl Benzene	<0.0010	--	--	<0.0010	--	--
Toluene	<0.0010	--	--	<0.0010	--	--
Xylenes	<0.0010	--	--	<0.0010	--	--
Arsenic	0.0120	--	--	0.477	--	--
Arsenic, filtered	0.0078	--	--	0.498	--	--
Iron, filtered	0.343	--	--	1.33	--	--
Manganese, filtered	0.331	--	--	0.106	--	--
Total Alkalinity as CaCO <sub>3</sub>	203	--	--	221	--	--
Total Dissolved Solids	251	236	--	260	264	--
Chloride	11.8	12.6	12.0	2.5	2.5	2.4
Cyanide, WAD	0.0050	--	--	<0.0050	--	--
Sulfate	6.3	5.2	--	4.8	6.5	--
Sulfide, total	<0.1	--	--	<0.1	--	--
Thiocyanate	1.48	1.64	--	1.31	1.48	--
Ammonia Nitrogen	<0.2	<0.2	<0.2	<0.2	<0.2	0.4
Nitrate	<0.05	<0.05	--	<0.05	<0.05	--
Nitrite	<0.05	<0.05	--	<0.05	<0.05	--
Phosphorus, total	0.15	--	--	0.92	--	--
Total Kjeldahl Nitrogen	0.6	--	--	1.8	--	--
Biochemical Oxygen Demand (5-day)	<10	--	--	<10	--	--
Chemical Oxygen Demand	<20	--	--	<20	--	--
Carbon, dissolved	37.2	--	--	33.4	--	--
Phenol, 4AAP	0.04	0.15	--	0.08	0.09	--
Carbon, total organic	3.1	--	--	4.0	--	--
Carbon, dissolved organic	2.9	--	--	2.0	--	--
Temperature, oC	19.3	--	--	16.2	--	--
Specific Conductance @ 25oC	430	--	--	423	--	--
pH, standard units	7.47	--	--	7.70	--	--
Redox, mV	-173	--	--	-205	--	--
Dissolved Oxygen	0.12	--	--	0.05	--	--
Nitrite	7-10	--	--	2-4	--	--
Nitrate	20-25	--	--	5-10	--	--

-- Not analyzed.

j Reported value is less than the stated laboratory quantitation limit and is considered an estimated value.

3,.004

11/04/97

1997 BEACH TRANSECT SAMPLES  
WATER QUALITY DATA

(concentrations in mg/L, unless noted otherwise)

	SB6318			SB6324		
	09/12/97	09/12/97	09/12/97	09/12/97	09/12/97	09/12/97
Sample I.D.	Sample	Replicate A	Replicate B	Sample	Replicate A	Replicate B
Soil Boring	SB-63W18	SB-63W18	SB-63W18	SB-63W24	SB-63W24	SB-63W24
Depth	63	63	63	63	63	63
Phenol	0.082	--	--	0.051	--	--
2-Chlorophenol	<0.020	--	--	<0.0010	--	--
o-Cresol	0.008 j	--	--	0.004 j	--	--
m-Cresol	--	--	--	--	--	--
p-Cresol	0.023	--	--	0.014	--	--
2,4-Dimethylphenol	<0.020	--	--	<0.010	--	--
2-Nitrophenol	<0.020	--	--	<0.010	--	--
Benzoic Acid	<0.10	--	--	<0.050	--	--
2,4-Dichlorophenol	<0.020	--	--	<0.010	--	--
4-Chloro-3-methylphenol	<0.020	--	--	<0.010	--	--
2,4,6-Trichlorophenol	<0.020	--	--	<0.010	--	--
2,4,5-Trichlorophenol	<0.10	--	--	<0.050	--	--
2,4-Dinitrophenol	<0.10	--	--	<0.050	--	--
4-Nitrophenol	<0.10	--	--	<0.050	--	--
2-Methyl-4,6-dinitrophenol	<0.10	--	--	<0.050	--	--
Pentachlorophenol	<0.10	--	--	<0.050	--	--
Benzene	<0.0010	--	--	0.022	--	--
Ethyl Benzene	<0.0010	--	--	<0.0010	--	--
Toluene	<0.0010	--	--	<0.0010	--	--
Xylenes	0.0016	--	--	<0.0010	--	--
Arsenic	0.393	--	--	0.782	--	--
Arsenic, filtered	0.377	--	--	0.762	--	--
Iron, filtered	1.53	--	--	1.70	--	--
Manganese, filtered	0.0979	--	--	0.0658	--	--
Total Alkalinity as CaCO <sub>3</sub>	231	--	--	293	--	--
Total Dissolved Solids	297	263	--	399	428	--
Chloride	2.8	2.7	2.9	85.0	83.9	84.5
Cyanide, WAD	0.0058	--	--	0.0064	--	--
Sulfate	<2.0	<2.0	--	<2.0	<2.0	--
Sulfide, total	<0.1	--	--	0.2	--	--
Thiocyanate	1.64	<1	--	1.64	1.31	--
Ammonia Nitrogen	0.9	0.4	<0.2	9.9	9.5	10.8
Nitrate	<0.05	<0.05	--	<0.05	<0.05	--
Nitrite	<0.05	<0.05	--	<0.05	<0.05	--
Phosphorus, total	0.37	--	--	1.19	--	--
Total Kjeldahl Nitrogen	2.2	--	--	13.5	--	--
Biochemical Oxygen Demand (S-day)	<10	--	--	<10	--	--
Chemical Oxygen Demand	<20	--	--	44	--	--
Carbon, dissolved	40.0	--	--	47.2	--	--
Phenol, 4AAP	0.20	0.28	--	<0.01	0.06	--
Carbon, total organic	9.4	--	--	9.5	--	--
Carbon, dissolved organic	3.9	--	--	2.4	--	--
Temperature, oC	16.4	--	--	12.7	--	--
Specific Conductance @ 25oC	130	--	--	721	--	--
pH, standard units	7.88	--	--	7.66	--	--
Redox, mV	-144	--	--	-185	--	--
Dissolved Oxygen	8.16	--	--	0.01	--	--
Nitrite	0.1-1.25	--	--	0.1-1.25	--	--
Nitrate	0.2-5	--	--	0-2.5	--	--

-----

-- Not analyzed.

j Reported value is less than the stated laboratory quantitation limit and is considered an estimated value.

3,.004

11/04/97

**1997 BEACH TRANSECT SAMPLES**  
**WATER QUALITY DATA**

(concentrations in mg/L, unless noted otherwise)

	SB6330	SB6406				
	09/12/97	09/12/97	09/12/97	09/11/97	09/11/97	09/11/97
Sample	Replicate A	Replicate B	Sample	Replicate A	Replicate B	
Sample I.D.	SB-63W30	SB-63W30	SB-63W30	SB-64W06	SB-64W06	--
Soil Boring	63	63	63	64	64	--
Depth	30	30	30	6	6	--
Phenol	490	--	--	<0.010	--	--
2-Chlorophenol	<90	--	--	<0.010	--	--
o-Cresol	50 j	--	--	<0.010	--	--
m-Cresol	--	--	--	--	--	--
p-Cresol	200	--	--	<0.010	--	--
2,4-Dimethylphenol	11 j	--	--	<0.010	--	--
2-Nitrophenol	<90	--	--	<0.010	--	--
Benzoic Acid	<450	--	--	0.005 j	--	--
2,4-Dichlorophenol	<90	--	--	<0.010	--	--
4-Chloro-3-methylphenol	<90	--	--	<0.010	--	--
2,4,6-Trichlorophenol	<90	--	--	<0.010	--	--
2,4,5-Trichlorophenol	<450	--	--	<0.050	--	--
2,4-Dinitrophenol	<450	--	--	<0.050	--	--
4-Nitrophenol	<450	--	--	<0.050	--	--
2-Methyl-4,6-dinitrophenol	<450	--	--	<0.050	--	--
Pentachlorophenol	<450	--	--	<0.050	--	--
Benzene	0.68	--	--	<0.0010	--	--
Ethyl Benzene	<0.050	--	--	<0.0010	--	--
Toluene	<0.050	--	--	<0.0010	--	--
Xylenes	<0.050	--	--	<0.0010	--	--
Arsenic	50.8	--	--	<0.0050	--	--
Arsenic, filtered	49.4	--	--	<0.0050	--	--
Iron, filtered	1.04	--	--	<0.100	--	--
Manganese, filtered	0.0242	--	--	0.0474	--	--
Total Alkalinity as CaCO <sub>3</sub>	2670	--	--	185	185	--
Total Dissolved Solids	1590	1610	--	230	243	--
Chloride	3340	2890	3190	7.0	6.7	6.5
Cyanide, WAD	243	--	--	<0.0050	<0.0050	--
Sulfate	588	562	--	37.0	34.5	--
Sulfide, total	6.7	--	--	<0.1	<0.1	--
Thiocyanate	581	621	--	<1	<1	--
Ammonia Nitrogen	979	1190	1010	<0.2	<0.2	<0.2
Nitrate	<0.05	<0.05	--	0.84	0.82	--
Nitrite	<0.05	<0.05	--	<0.05	<0.05	--
Phosphorus, total	5.17	--	--	0.08	0.08	--
Total Kjeldahl Nitrogen	1850	--	--	0.6	0.6	--
Biochemical Oxygen Demand (5-day)	2500	--	--	<20	<20	--
Chemical Oxygen Demand	5380	--	--	<20	<20	--
Carbon, dissolved	1500	--	--	17.9	17.9	--
Phenol, 4AAP	900	918	--	0.29	0.01	--
Carbon, total organic	1300	--	--	2.8	2.8	--
Carbon, dissolved organic	1250	--	--	2.0	2.0	--
Temperature, °C	11.4	--	--	18.9	--	--
Specific Conductance @ 25°C	1400	--	--	30	--	--
pH, standard units	8.58	--	--	7.43	--	--
Redox, mV	-298	--	--	10	--	--
Dissolved Oxygen	0.04	--	--	5.77	--	--
Nitrite	0-1.25	--	--	10-15	--	--
Nitrate	0-2.5	--	--	20-30	--	--

-----  
-- Not analyzed.

j Reported value is less than the stated laboratory quantitation limit and is considered an estimated value.

3,.004

11/04/97

**1997 BEACH TRANSECT SAMPLES**  
**WATER QUALITY DATA**

(concentrations in mg/L, unless noted otherwise)

	SB6412			SB6418		
	09/11/97 Sample	09/11/97 Replicate A	09/11/97 Replicate B	09/11/97 Sample	09/11/97 Replicate A	09/11/97 Replicate B
Sample I.D.	SB-64W12	SB-64W12	SB-64W12	SB-64W18	SB-64W18	SB-64W18
Soil Boring	64	64	64	64	64	64
Depth	12	12	12	18	18	18
Phenol	<0.010	--	--	<0.010	--	--
2-Chlorophenol	<0.010	--	--	<0.010	--	--
o-Cresol	<0.010	--	--	<0.010	--	--
m-Cresol	--	--	--	--	--	--
p-Cresol	<0.010	--	--	<0.010	--	--
2,4-Dimethylphenol	<0.010	--	--	<0.010	--	--
2-Nitrophenol	<0.010	--	--	<0.010	--	--
Benzoic Acid	0.006 j	--	--	0.15 e	--	--
2,4-Dichlorophenol	<0.010	--	--	<0.010	--	--
4-Chloro-3-methylphenol	<0.010	--	--	<0.010	--	--
2,4,6-Trichlorophenol	<0.010	--	--	<0.010	--	--
2,4,5-Trichlorophenol	<0.050	--	--	<0.050	--	--
2,4-Dinitrophenol	<0.050	--	--	<0.050	--	--
4-Nitrophenol	<0.050	--	--	<0.050	--	--
2-Methyl-4,6-dinitrophenol	<0.050	--	--	<0.050	--	--
Pentachlorophenol	<0.050	--	--	<0.050	--	--
Benzene	<1.0	--	--	<0.0010	--	--
Ethyl Benzene	<1.0	--	--	<0.0010	--	--
Toluene	<1.0	--	--	<0.0010	--	--
Xylenes	<1.0	--	--	<0.0010	--	--
Arsenic	0.0378	--	--	0.0403	--	--
Arsenic, filtered	0.0348	--	--	0.0478	--	--
Iron, filtered	0.461	--	--	1.29	--	--
Manganese, filtered	0.0533	--	--	0.0807	--	--
Total Alkalinity as CaCO <sub>3</sub>	128	--	--	201	--	--
Total Dissolved Solids	180	173	--	245	239	--
Chloride	7.3	7.2	--	4.0	3.3	3.9
Cyanide, WAD	<0.0050	--	--	<0.0050	<0.0050	--
Sulfate	31.6	31.8	--	12.6	2.8	--
Sulfide, total	<0.1	--	--	<0.1	<0.1	--
Thiocyanate	<1	<1	--	<1	<1	--
Ammonia Nitrogen	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Nitrate	<0.05	<0.05	--	0.05	<0.05	--
Nitrite	<0.05	<0.05	--	<0.05	<0.05	--
Phosphorus, total	0.52	--	--	0.37	0.37	--
Total Kjeldahl Nitrogen	<0.1	--	--	0.9	0.9	--
Biochemical Oxygen Demand (5-day)	<20	--	--	<20	<20	--
Chemical Oxygen Demand	<20	--	--	<20	<20	--
Carbon, dissolved	4.9	--	--	15.4	15.4	--
Phenol, 4AAP	0.36	0.91	--	<0.01	0.02	--
Carbon, total organic	1.9	--	--	3.2	3.2	--
Carbon, dissolved organic	1.2	--	--	3.0	3.0	--
Temperature, oC	17.4	--	--	15.9	--	--
Specific Conductance @ 25oC	--	--	--	40	--	--
pH, standard units	7.85	--	--	7.84	--	--
Redox, mV	-102	--	--	-166	--	--
Dissolved Oxygen	2.16	--	--	2.36	--	--
Nitrite	10-15	--	--	2-4	--	--
Nitrate	15-20	--	--	2.5-5	--	--

-- Not analyzed.

e Estimated value, exceeded the instrument calibration range.

j Reported value is less than the stated laboratory quantitation limit and is considered an estimated value.

3,.004

11/04/97

**1997 BEACH TRANSECT SAMPLES**  
**WATER QUALITY DATA**

(concentrations in mg/L, unless noted otherwise)

	SB6424			SB6430		
	09/11/97 Sample	09/11/97 Replicate A	09/11/97 Replicate B	09/12/97 Sample	09/12/97 Replicate A	09/12/97 Replicate B
Sample I.D.	SB-64W24	SB-64W24	SB-64W24	SB-64W30	SB-64W30	SB-64W30
Soil Boring	64	64	64	64	64	64
Depth	24	24	24	30	30	30
Phenol	<0.010	--	--	140	--	--
2-Chlorophenol	<0.010	--	--	<30	--	--
o-Cresol	<0.010	--	--	15 j	--	--
m-Cresol	--	--	--	--	--	--
p-Cresol	<0.010	--	--	55	--	--
2,4-Dimethylphenol	<0.010	--	--	<30	--	--
2-Nitrophenol	<0.010	--	--	<30	--	--
Benzoic Acid	0.076	--	--	<150	--	--
2,4-Dichlorophenol	<0.010	--	--	<30	--	--
4-Chloro-3-methylphenol	<0.010	--	--	<30	--	--
2,4,6-Trichlorophenol	<0.010	--	--	<30	--	--
2,4,5-Trichlorophenol	<0.050	--	--	<150	--	--
2,4-Dinitrophenol	<0.050	--	--	<150	--	--
4-Nitrophenol	<0.050	--	--	<150	--	--
2-Methyl-4,6-dinitrophenol	<0.050	--	--	<150	--	--
Pentachlorophenol	<0.050	--	--	<150	--	--
Benzene	<0.0010	--	--	0.23	--	--
Ethyl Benzene	<0.0010	--	--	<0.010	--	--
Toluene	<0.0010	--	--	<0.010	--	--
Xylenes	<0.0010	--	--	0.013	--	--
Arsenic	0.0971	--	--	12.0	--	--
Arsenic, filtered	0.0818	--	--	12.9	--	--
Iron, filtered	1.15	--	--	0.860	--	--
Manganese, filtered	0.0402	--	--	0.128	--	--
Total Alkalinity as CaCO <sub>3</sub>	323	--	--	1970	--	--
Total Dissolved Solids	380	370	--	629	595	--
Chloride	118	112	110	936	840	1050
Cyanide, WAD	0.0090	--	--	0.145	--	--
Sulfate	<2.0	<2.0	--	194	152	--
Sulfide, total	0.2	--	--	4.2	--	--
Thiocyanate	<1	<1	--	161	171	--
Ammonia Nitrogen	27.7	28.7	27.5	491	532	569
Nitrate	<0.05	<0.05	--	<0.05	<0.05	--
Nitrite	<0.05	<0.05	--	<0.05	<0.05	--
Phosphorus, total	0.71	--	--	5.39	--	--
Total Kjeldahl Nitrogen	36.3	--	--	654	--	--
Biochemical Oxygen Demand (5-day)	<20	--	--	800	--	--
Chemical Oxygen Demand	48	--	--	1390	--	--
Carbon, dissolved	34.2	--	--	445	--	--
Phenol, 4AAP	0.14	0.10	--	246	265	--
Carbon, total organic	4.2	--	--	362	--	--
Carbon, dissolved organic	3.4	--	--	356	--	--
Temperature, oC	14	--	--	12.9	--	--
Specific Conductance @ 25oC	70	--	--	619	--	--
pH, standard units	7.80	--	--	8.14	--	--
Redox, mV	-148	--	--	-296	--	--
Dissolved Oxygen	0.06	--	--	0.05	--	--
Nitrite	0-1.25	--	--	2-5	--	--
Nitrate	0-2.5	--	--	5-10	--	--

-- Not analyzed.

j Reported value is less than the stated laboratory quantitation limit and is considered an estimated value.

1,.004

11/04/97

Barr Surveyors		DRILLING LOG				SHEET OF 2 / SHEETS			
PROJECT NAME/NO. WCP 13/49-003 JSL 276				SIZE AND TYPE OF BIT 4-1/2 HSA					
LOCATION (Coordinates or Section) SEE FIGURE				DATUM FOR ELEV. SHOWN MSL					
DRILLING AGENCY BOART LONGYEAR				MANUFACTURERS DESIGNATION OF DRILL MOSLE 8.57 ATV					
HOLE NO. SB - 61				TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN Disturbed Undisturbed					
NAME OF DRILLER MIKE MUELLEIR				TOTAL NO. CORE BOXES					
DIRECTION OF HOLE <input checked="" type="checkbox"/> Vertical <input type="checkbox"/> Inclined Deg. from Ver.				ELEV. GROUNDWATER 582.4					
THICKNESS OF OVERBURDEN NA				DATE HOLE: 9/19/97 Started 9/19/97 Completed					
DEPTH DRILLED INTO ROCK NA				ELEV. TOP OF HOLE 585.4					
TOTAL DEPTH OF HOLE 33.5'				SIGNATURE OF INSPECTOR John Mil Fox					
SAMPLE	DEPTH	SOL. PH	CLASSIFICATION OF MATERIALS (Description)	RECOV. ERY	N	/	REMARKS		
SS	1	7.3	Poorly Graded Sand (SP) Fine Grained PALE BROWN (10YR 6/3) Moist	10"	2		OVA READINGS 0/0/0 = 0		
HP	2		(Alluvium)						
HP	3		WET BELOW 3.0' 4.0' (581.4')	4	0				
EXPOSED	4			5	3				
HSA	5		Poorly Graded Sand (SP) Fine Grained Grey (5GY 6/0)	5	2				
	6		WET						
SS	7	7.5	W/ SMALL SHELL FRAGMENTS	16"	10				
HP	8		(Alluvium)						
HP	9		10.0' (575.4')	10	3				
EXPOSED	10			11	2				
HSA	11		Poorly Graded Sand (SP/SP-SM)	11	2				
	12		Fine Grained						
SS	13	7.8	Grey (5GY 6/0) WET	22"	11		OVA 15/8/6 = 7		
	14								
HP	15		W/ SOME SHELL FRAGMENTS	16	3				
HP	16		(Alluvium)	17	2				
EXPOSED	17			18	1				
HSA	18								
SS	19	8.6		19	15		OVA 175/75/70 = 100		



Barr		DRILLING LOG				SHEET OF 2 SHEETS	
PROJECT NAME/NO. WCP 13/49-003 JSL 276		SIZE AND TYPE OF BIT $\frac{1}{2}$ HSA					
LOCATION (Coordinates or Section) SEE FIGURE		DATUM FOR ELEV. SHOWN MSL					
DRILLING AGENCY BOART LONGYEAR		MANUFACTURERS DESIGNATION OF DRILL MOSLE 2-57 ATV					
HOLE NO. 5B - 62		TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN Disturbed Undisturbed					
NAME OF DRILLER MIKE MUELLEIR		TOTAL NO. CORE BOXES					
DIRECTION OF HOLE <input checked="" type="checkbox"/> Vertical <input type="checkbox"/> Indicated Deg. from Vert.		ELEV. GROUNDWATER 582.9					
THICKNESS OF OVERTBURDEN NA		DATE HOLE: 9/12/97 Started 9/13/97 Completed					
DEPTH DRILLED INTO ROCK NA		ELEV. TOP OF HOLE 584.4					
TOTAL DEPTH OF HOLE 31.5'		SIGNATURE OF INSPECTOR John Mc Fox					
SAMPLE	DEPTH	SOIL PH	CLASSIFICATION OF MATERIALS (consistency)	RECOV. ERY	N	REMARKS	
HSA	1	7.8	Poorly Graded Sand (Sp) Fine Grained Pale Brown (loYLG/b) Moist			OVA 0/0/0 = 0 No Odor	
SS	2						
SS	3	7.8	W/ Small Shell Fragments	15"	11	OVA 25/15/10 = 10 No Odor	
HP	4						
HP EXPOSED	5		WET BELOW 1.5 - FEET (ALLUVIUM)				
HP EXPOSED	6		6.0' (678.4')				
HSA	7		Poorly Graded Sand W/ Silt (Sp-Sm / Sp)				
SS	8	8.5	Fine Grained Grey (loYR S/I) WET	24"	11	OVA 100/90/70 = 10 No Odor	
HP	9						
HP EXPOSED	10		(ALLUVIUM)				
HP	11						
HP EXPOSED	12						
HSA	13						
SS	14						
SS	15	8.7		16"	35	OVA 10/5/5 = 2 No Odor	
HP	16						
HP EXPOSED	17						
HSA	18						

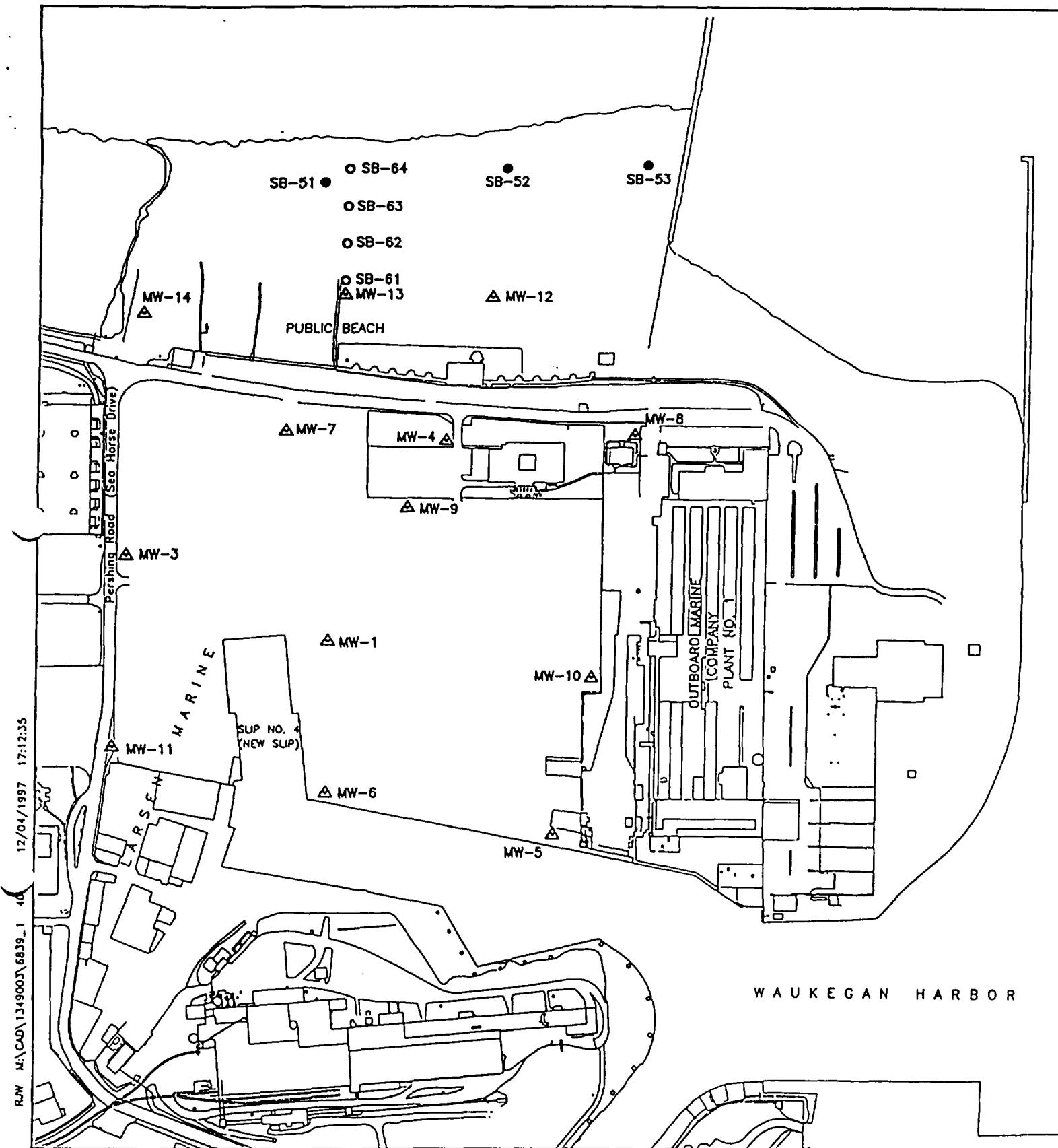
Barr		DRILLING LOG					SHEET <u>2</u> OF <u>2</u> SHEETS	
PROJECT NAME/NO. WCP 13/49-003 JSL 276		SIZE AND TYPE OF SIT 4 1/2 HSA						
LOCATION (Coordinates or Section)		DATUM FOR ELEV. SHOWN MSL						
DRILLING AGENCY BOATNT LONGYEAR		MANUFACTURERS DESIGNATION OF DRILL B-57						
HOLE NO. SB - 62		TOTAL NO. OF OVER- BURDEN SAMPLES TAKEN Disturbed Undisturbed						
NAME OF DRILLER MIKE MUELLEN		TOTAL NO. CORE BOXES						
DIRECTION OF HOLE <input checked="" type="checkbox"/> Vertical <input type="checkbox"/> Inclined Deg. from Ver.		ELEV. GROUNDWATER						
THICKNESS OF OVERBURDEN NA		DATE HOLE: 9/12/59 Started 9/13/59 Completed						
DEPTH DRILLED INTO ROCK NA		ELEV. TOP OF HOLE 58 ft.						
TOTAL DEPTH OF HOLE 31.5'		SIGNATURE OF INSPECTOR John M. Fox						
SAMPLE	DEPTH	SOIL PH	CLASSIFICATION OF MATERIALS (Division)			RECOV- ERY	N	REMARKS
SS	21	8.2	SAME AS ABOVE SEE PAGE 1 FOR CLASSIFICATION			15"	33	OVA 50/25/40 = 25
HP	22							SLIGHT ODOR
HP EXPOSED	23							
	24		24.5 (559.9')			SB 62 U 24	5	
HSA	25		SILTY SAND (SM/SP-SM) FINE GRAINED					
	26		DARK GREY (10YR 4/1) WET					
SS	27	8.5				24"	17	OVA 400/200/200 = 200
	28		(ALLUVIUM)					STRONG ODOX
HP EXPOSED	29							
	30							
HSA	31		TOP OF TELL 31.5' BASED ON TOOL ACTION			SB 62 U 30	5	
	32		31.5 END OF BORING					
	33		(552.9')					
	34							
	35							
	36							
	37							
	38							
	39							
	40							

Barr		DRILLING LOG				SHEET OF 2 SHEETS
PROJECT NAME NO. WCP 13149-003 JSL 276		SIZE AND TYPE OF BIT 4 1/2" HSA				
LOCATION (Coordinates or Station) SEE FIGURE		DATUM FOR ELEV. SHOWN MSL				
DRILLING AGENCY BOART LONGYEAR		MANUFACTURERS DESIGNATION OF DRILL MOSLE 6.57 ATV				
HOLE NO. SB - 63		TOTAL NO. OF OVER-SURFACE SAMPLES TAKEN Disturbed Undisturbed				
NAME OF DRILLER MIKE MUELLEIR		TOTAL NO. CORE BOXES				
DIRECTION OF HOLE <input checked="" type="checkbox"/> Vertical <input type="checkbox"/> Inclined Deg. from Ver.		ELEV. GROUNDWATER 583.1				
THICKNESS OF OVERSURFACe NA		DATE HOLE: 9/12/97 Started 9/12/97 Completed				
DEPTH DRILLED INTO ROCK NA		ELEV. TOP OF HOLE 583.6				
TOTAL DEPTH OF HOLE 31.5'		SIGNATURE OF INSPECTOR John M Fox				
SAMPLE	DEPTH	SIL. PH	CLASSIFICATION OF MATERIALS (Description)	RECOV. ERY	N	REMARKS
HSA	1		Poorly Graded Sand (SP) Fine to Medium Grained			No Soil Ova Oil PH Readings 0-2'
	2					
SS	3	7.8	PALE BROWN (10YR 6/3) MOIST	14"	5	OVA 20/15/10 = 2 No Odor
	4					
HP	5					
HP EXPOSED	6					
	7					
HSA	8					
	9	8.3	W/ SMALL SHELL FRAGMENTS			
SS	10					
	11					
HP	12					
HP EXPOSED	13					
	14					
SS	15	9.0	15.0' (568.6)	20"	13	100/75/75 = 25 Slight odor
	15					
HP	17		SILTY SAND (SM/SP-SM) FINE GRAINED			
	18		GREY (10YR 5/1)			
HP EXPOSED	19		WET			
	20					
HSA			(ALLUVIUM)			

Barr Drillers		DRILLING LOG			SHEET Z OF Z SHEETS	
PROJECT NAME/NO.	WCP 13/49-003 JSL 276	SIZE AND TYPE OF BIT	4 1/2 HSA			
LOCATION (Coordinates or Section)		DATUM FOR ELEV. SHOWN	MSL			
DRILLING AGENCY	BOATNUT LONGYEAR	MANUFACTURERS DESIGNATION OF DRILL	B-57			
HOLE NO.	SB - 63	TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	Disturbed _____ Undisturbed _____			
NAME OF DRILLER	MIKE MUELLER	TOTAL NO. CORE BOXES				
DIRECTION OF HOLE	<input checked="" type="checkbox"/> Vertical <input type="checkbox"/> Inclined _____ Deg. from Vert.	ELEV. GROUNDWATER				
THICKNESS OF OVERTBURDEN	NA	DATE HOLE: 9/11/91 Started 9/11/91 Completed				
DEPTH DRILLED INTO ROCK	NA	ELEV. TOP OF HOLE	583.6			
TOTAL DEPTH OF HOLE	31.5'	SIGNATURE OF INSPECTOR	A. M. Fox			
SAMPLE	DEPTH	SOIL PH	CLASSIFICATION OF MATERIALS (Description)	RECOV. ERY	N	REMARKS
SS	21	8.0	SAME AS ABOVE SEE PAGE 1 FOR CLASSIFICATION	22"	13	OVA 73/50/60 = 25 ODOR
HP	22					
HP	23					
EXPOSED	24					
	25					
HSA	25					
	25					
SS	27	8.2		17"	13	OVA 130/30/25 = 100 STRONG ODOR
	28					
HP	29					
EXPOSED	30					
	31		TOP OF TILL C 31.5± BASED ON TOOL ACTION	586320	20	
HSA	32		END OF BORING 31.5 (552.1')			
	33					
	34					
	35					
	36					
	37					
	38					
	39					

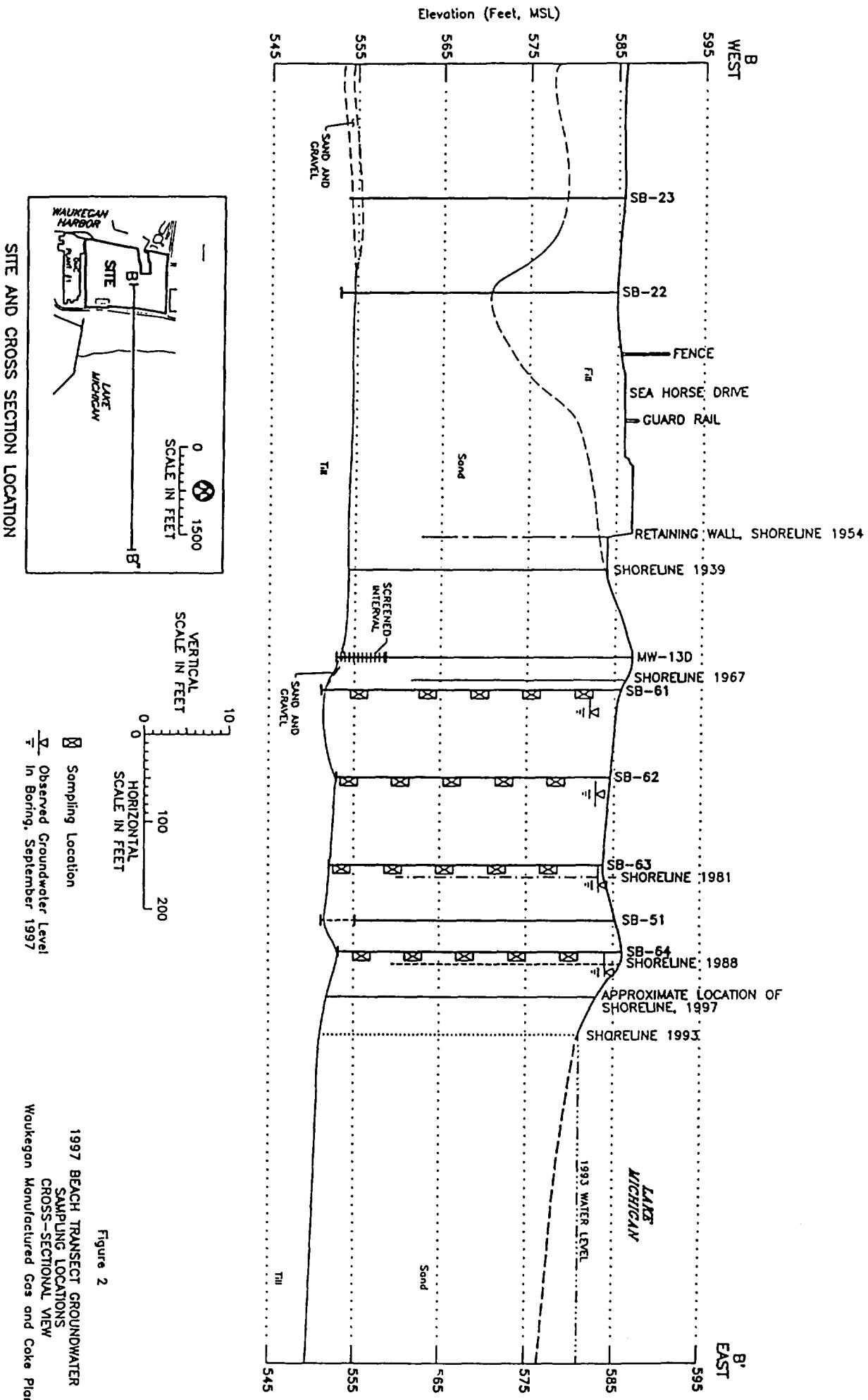
Barr		DRILLING LOG				SHEET OF 2	1 SHEETS
PROJECT NAME/NO. WCP 13149-003 JSL 276		SIZE AND TYPE OF BIT 4 1/2 HSA					
LOCATION (Coordinates or Section) SEE FIGURE		DATUM FOR ELEV. SHOWN MSL					
DRILLING AGENCY BOART LONGYEAR		MANUFACTURERS DESIGNATION OF DRILL MOSLE 257 ATV					
HOLE NO. SB - 64		TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN Disturbed Undisturbed					
NAME OF DRILLER MIKE MUELLEIR		TOTAL NO. CORE BOXES					
DIRECTION OF HOLE <input checked="" type="checkbox"/> Vertical <input type="checkbox"/> Inclined Deg. from Vert.		ELEV. GROUNDWATER 583.9'					
THICKNESS OF OVERTBURDEN NA		DATE HOLE: 9/11/97 Started 9/12/97 Completed					
DEPTH DRILLED INTO ROCK NA		ELEV. TOP OF HOLE 585.9					
TOTAL DEPTH OF HOLE 367'		SIGNATURE OF INSPECTOR John Mil Fox					
SAMPLE	DEPTH	5' I.C. PH	CLASSIFICATION OF MATERIALS (Description)		RECOV- ERY	N	/ REMARKS
HSA	1	8.1	POORLY GRADED SAND(s) FINE GRAINED PALE BROWN (10yrl6/3) MOIST				OVA 0/0/0 = 0 NO ODOUR
	2		WET BELOW 2'		12"	7	OVA 2/3/2 = 1 NO ODOUR
SS	3	8.2					
	4						
HP	5						
HP EXPOSED	6		(ALLUVIUM)				
	7						
HSA	8						
SS	9	8.2			22"	11	OVA 0/0/0 = 0 NO ODOUR
	10						
HP	11						
HP EXPOSED	12				SB6+W12		
	13						
HSA	14						
SS	15	8.2			22"	12	OVA 9/5/6 = 4 NO ODOUR
	15						
HP	17						
HP EXPOSED	18		18.0 (567.9')			18	
	19		SEE DESCRIPTION ON PAGE 2				
HSA							

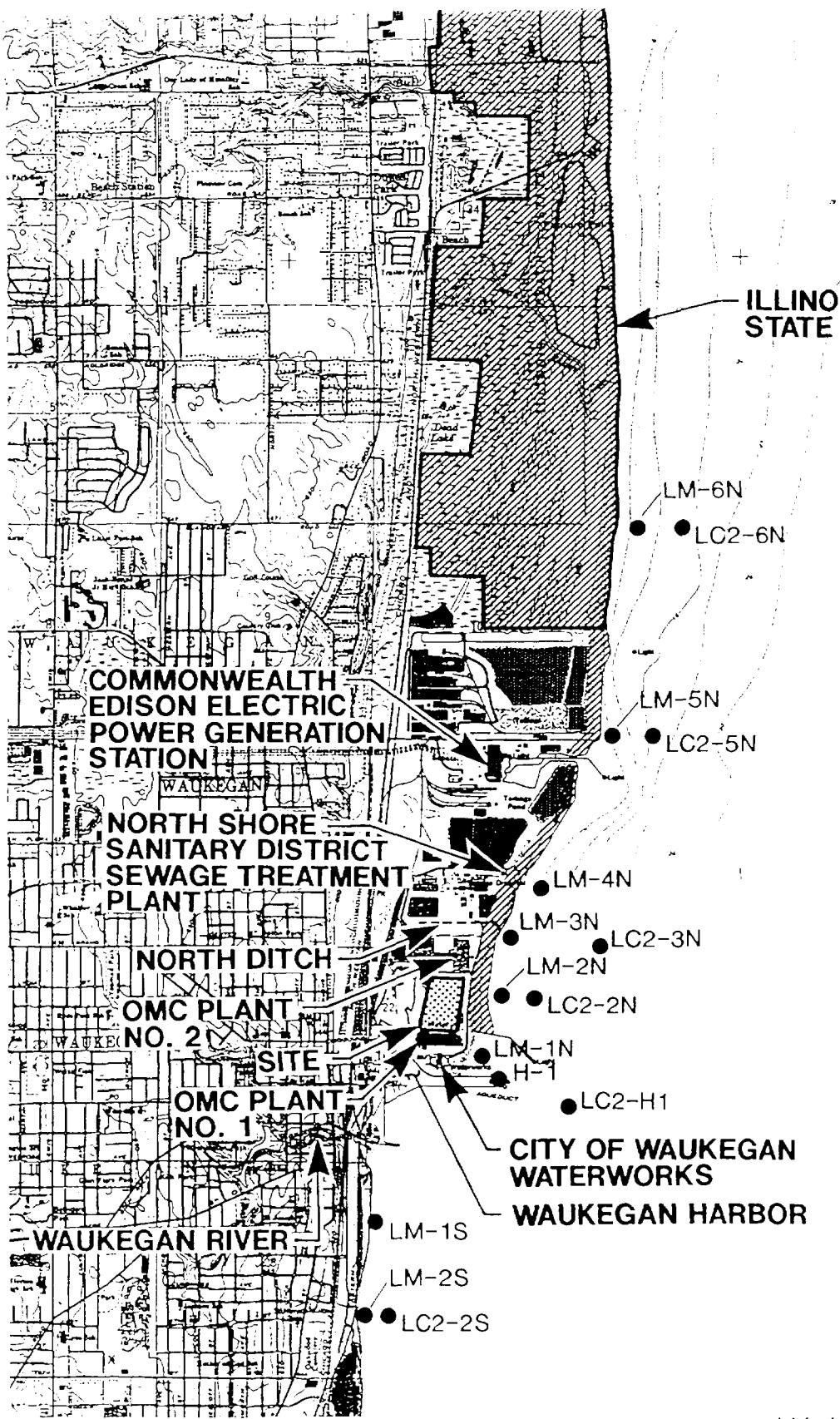
Barr		DRILLING LOG				SHEET Z OF Z SHEETS
PROJECT NAME/NO. WCP 13/49-003 JSI 276		SIZE AND TYPE OF BIT 4 1/2 HSA				
LOCATION (Coordinates or Section)		DATUM FOR ELEV. SHOWN MSL				
DRILLING AGENCY BOART LONGYEAR		MANUFACTURERS DESIGNATION OF DRILL B-57				
HOLE NO. SB - 64		TOTAL NO. OF OVER-SURFACE SAMPLES TAKEN Disturbed Undisturbed				
NAME OF DRILLER MIKE MUELLEN		TOTAL NO. CORE BOXES				
DIRECTION OF HOLE <input checked="" type="checkbox"/> Vertical <input type="checkbox"/> Inclined Deg. from Ver.		ELEV. GROUNDWATER				
THICKNESS OF OVERTBURDEN NA		DATE HOLE: 9/11/71 Started 9/12/71 Completed				
DEPTH DRILLED INTO ROCK NA		ELEV. TOP OF HOLE 585.9'				
TOTAL DEPTH OF HOLE 32.7'		SIGNATURE OF INSPECTOR A. M. Fox				
SAMPLE	DEPTH	Soil PH	CLASSIFICATION OF MATERIALS (Description)	RECOV. RERY	N	REMARKS
SS	21	8.4	Poorly Graded Sand w/ Silt (Sp-Sm/Sp) Fine Grained	23"	9	OVA 45/15/25 = 30 No odor
HP	22					
HP	23		Greyish-Brown (10yr St)			
EXPOSED	24		WET			
HSA	25					
SS	27	8.1				
	28		(Alluvium)	24"	11	OVA 100/100/50 = 0 Slight odor
HP	29					
EXPOSED	30					
	31					
HSA	32		Till C 32.7' ± Based on tool action			
	33		32.7' END OF BORING (553.2')			
	34					
	35					
	36					
	37					
	38					
	39					



- △ MW-7 Sand Aquifer Monitoring Well
- Previous Beach Boring Location
- Beach Transect Groundwater Sample Location

Figure 1  
 1997 BEACH TRANSECT  
 GROUNDWATER SAMPLING LOCATIONS  
 Waukegan Manufactured Gas & Coke Plant





LM-1N

Surface Water Sampling Location



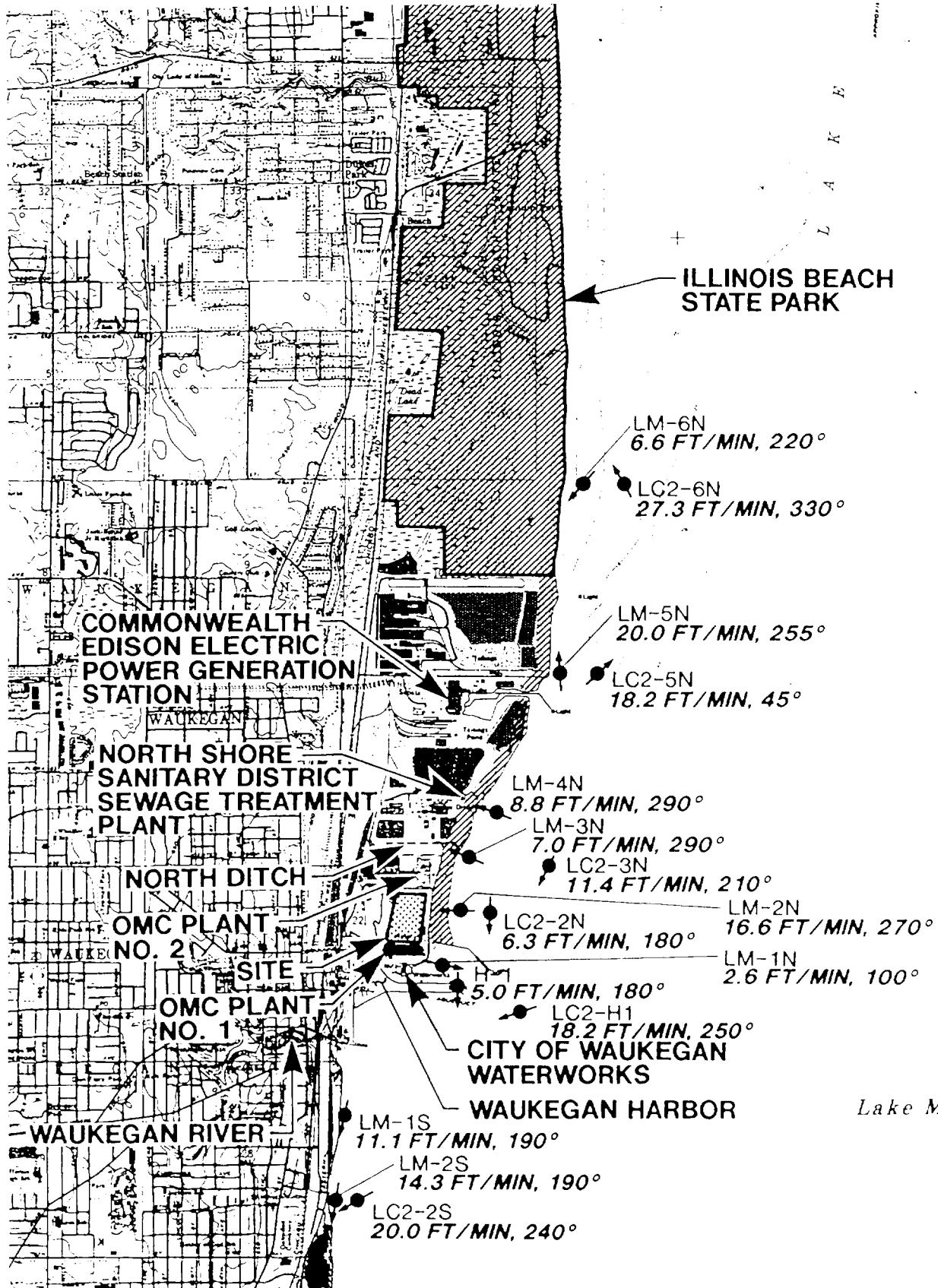
0 4000 8000

Scale in Feet



Figure 3

SEPTEMBER 1997 SURFACE  
WATER SAMPLING LOCATIONS  
Waukegan Manufactured Gas & Coke Plant



Source: Waukegan and Zion, Illinois Quadrangles 7.5 Minute Series, 1980.

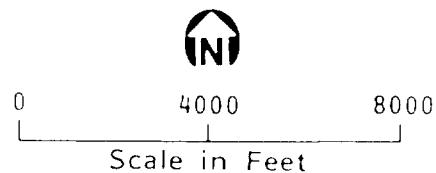


Figure 4  
SEPTEMBER 1997 SURFACE WATER VELOCITY MEASUREMENTS  
Waukegan Manufactured Gas & Coke Plant